

What is claimed is:

1. A playback method for a recording medium to which data is recorded in block units containing multiple fixed-length frames together with block address information, the playback method comprising steps of:

5 acquiring the data and the block address information from the recording medium;

predicting the recording position of each frame in a block from the acquired block address information;

synchronizing to the frame level based on the acquired data;

10 determining the memory address for storing the data acquired based on the predicted recording position; and

storing the acquired data at the determined memory address.

2. A playback method for a recording medium according to claim 1, further comprising steps of:

15 determining whether synchronization at the data frame unit level has been established; and

detecting whether synchronization at the frame unit has been restored if frame synchronization goes out-of-step;

20 wherein when recovery of frame synchronization is detected, the memory address to which data is stored is determined based on the predicted frame recording position.

3. A playback method for a recording medium according to claim 1, wherein the data memory address in memory is determined with the frame as the smallest recordable unit.

25 4. A playback method for a recording medium according to claim 1, wherein

block address information is recorded to the recording medium in a format different from the data recording format.

5. A playback method for a recording medium according to claim 1, further comprising steps of:

5 generating a result information for detection of synchronization code coded at the frame unit level according to specific rules;

demodulating the data in each frame to demodulated frame data; and

adding to each demodulated frame data block the result information for detection of synchronization code correlated to each frame.

10 6. A playback method for a recording medium according to claim 1, further comprising a step of synchronizing at the frame unit level based on the acquired address information.

7. A playback control circuit for a recording medium to which data is recorded in block units containing multiple fixed-length frames together with
15 block address information, comprising:

signal reading means for acquiring the data and the block address information from the recording medium;

a recording address predicting means for predicting the recording position of each frame in a block from the acquired block address information;

20 synchronization means for synchronizing to the frame level based on the acquired data;

memory for storing the data; and

control means for determining the memory address for storing data based on the predicted recording position.

25 8. A playback control circuit according to claim 7, further comprising a

synchronization detection means for determining whether synchronization at the data frame unit level has been established, and detecting whether synchronization at the frame unit has been restored if frame synchronization goes out-of-step;

5 wherein the control means determines the memory address to which data is stored based on the recording position predicted by the recording address predicting means when the synchronization detection means detects recovery of frame synchronization.

9. A playback control circuit according to claim 7, wherein the data memory
10 address in memory is determined with the frame as the smallest recordable unit.

10. A playback apparatus for a recording medium to which data is recorded in block units containing multiple fixed-length frames together with block address information, comprising the playback control circuit according to claim 7.

11. A playback method for reproducing data from a recording medium to
15 which is recorded modulated frame data and a specific synchronization code prepended to the beginning of the modulated frame data,

 the modulated frame data being error correction coded data segmented into multiple frame data blocks of a specific length and then modulated,

 the playback method comprising steps of:

20 acquiring signals from the recording medium;

 acquiring a detection result of synchronization code by detecting frame synchronization codes from the acquired signals;

 correcting frame synchronization based on the result for detection of acquired synchronization code;

25 generating a result information for detection of synchronization code

coded according to specific rules from the detection result of synchronization code;

demodulating the modulated frame data for each frame and generating demodulated frame data; and

5 adding the result information for detection of synchronization code for each frame to the corresponding demodulated frame data.

12. A playback method according to claim 11, further comprising:

10 a erasure pointer generating step for generating a erasure pointer for erasure correction based on the demodulated frame data using the corresponding result information for detection of synchronization code; and

an error correcting step for erasure correcting error correcting code from multiple demodulated frame data blocks using the erasure pointers for the demodulated frame data.

13. A playback method according to claim 11, further comprising:

15 a memory step for storing the result information for detection of synchronization code and corresponding demodulated frame data in different memory areas with a known correlation therebetween.

14. A playback method according to claim 11, wherein the result information for detection of synchronization code is coded to differentiate between at least
20 the three detection results of "normal detection" when the synchronization code is detected normally, "undetected" when the synchronization code is not detected, and "out-of-step synchronization" when a next synchronization code is detected at a timing offset from a timing predicted from the timing of the detection result for the previously detected synchronization code.

25 15. A playback method according to claim 11, wherein when the frame

synchronization step corrects synchronization delay in which a new synchronization code is detected earlier than the timing predicted from the timing of the detection result of the previously detected synchronization code, and the synchronization delay is less than one frame,

5 the memory step corrects the memory address of the frame data immediately after synchronization delay correction to an address derived by skipping an amount equivalent to the synchronization delay correction, and stores the frame data to the corrected address.

16. A playback method according to claim 15, wherein when the frame
10 synchronization step corrects synchronization delay in which a new synchronization code is detected earlier than the timing predicted from the timing of the previously detected synchronization code, and the synchronization delay is greater than or equal to one frame,

 the memory step corrects the memory address of the result information for
15 detection of synchronization code and frame data immediately after synchronization delay correction to an address shifted equivalently to the correction for the synchronization delay, and then stores the data to the corrected address; and

 the erasure pointer generating step determines that result information for
20 detection of synchronization code that is skipped and not stored to memory was undetected, and generates an erasure pointer thereto.

17. A playback control circuit for reproducing data from a recording medium to which is recorded modulated frame data and a specific synchronization code prepended to the beginning of the modulated frame data,

25 the modulated frame data being error correction coded data

segmented into multiple frame data blocks of a specific length and then modulated,

the playback control circuit comprising:

5 a frame synchronization means for correcting frame synchronization based on a detection result of synchronization code acquired by detecting frame synchronization codes from playback signals acquired from the recording medium;

10 a generating means for generating a result information for detection of synchronization code coded according to specific rules from the detection result of synchronization code;

a demodulation means for demodulating the modulated frame data for each frame and generating demodulated frame data;

15 an adding means for prepending the result information for detection of synchronization code for a frame to the beginning of the demodulated frame data;

memory for storing the result information for detection of synchronization code and demodulated frame data; and

memory control means for storing the result information for detection of synchronization code and demodulated frame data to memory.

20 18. A playback control circuit according to claim 17, further comprising:

erasure pointer generating means for generating a erasure pointer for erasure correction using the result information for detection of synchronization code; and

25 an error correcting means for erasure correcting error correcting code composed from demodulated frame data using the erasure pointers.

19. A playback control circuit according to claim 17, wherein the memory control means stores the result information for detection of synchronization code and demodulated frame data to different memory areas.

20. A playback control circuit according to claim 17, wherein the result
5 information for detection of synchronization code is coded to differentiate between at least the three detection results of "normal detection" when the synchronization code is detected normally, "undetected" when the synchronization code is not detected, and "out-of-step synchronization" when a next synchronization code is detected at a timing offset from a timing predicted
10 from the timing of the detection result for the previously detected synchronization code.

21. A playback control circuit according to claim 17, wherein when the frame synchronization means corrects synchronization delay in which a new synchronization code is detected earlier than the timing predicted from the timing
15 of the previously detected synchronization code, and the synchronization delay is less than one frame,

the memory control means corrects the memory address of the frame data immediately after synchronization delay correction to an address derived by skipping an amount equivalent to the synchronization delay correction, and
20 stores the frame data to the corrected address.

22. A playback control circuit according to claim 21, wherein when the frame synchronization means corrects synchronization delay in which a new synchronization code is detected earlier than the timing predicted from the timing of the previously detected synchronization code, and the synchronization delay is
25 greater than or equal to one frame,

the memory control means corrects the memory address of the result information for detection of synchronization code and frame data immediately after synchronization delay correction to an address shifted equivalently to the correction for synchronization delay, and then stores the frame data to the
5 corrected address; and

the erasure pointer generating means determines that result information for detection of synchronization code correspond to a frame that is skipped and not stored to memory was undetected, and generates an erasure pointer thereto.

23. A playback apparatus for reproducing data from a recording medium to
10 which is recorded modulated frame data and a specific synchronization code prepended to the beginning of the modulated frame data,

the modulated frame data being error correction coded data segmented into multiple frame data blocks of a specific length and then modulated,

15 the playback apparatus comprising the playback control circuit according to claim 17.